

ABSTRACT OF DISCLOSURE

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POLYIMIDES BY PHOTOCHEMICAL CYCLOCOPOLYMERIZATION

The novel polyimides of this invention are derived from Diels-Alder cyclopolymerization of photochemically generated bisdienes with dienophiles, such as 10 bismaleimides, trismaleimides and mixtures thereof with maleimide end-caps. Irradiation of one or more diketones produces two distinct hydroxy o-quinodimethane (photoenol) 15 intermediates. These intermediates are trapped via Diels-Alder cycloaddition with appropriate dienophiles, e.g., bismaleimide and/or trismaleimides to give the corresponding polyimides in quantitative yields. When bismaleimides, trismaleimides or 20 mixtures thereof with maleimide end-caps are used as the dienophile, the resulting polyimides have glass transition temperatures (Tg) as high as 300°C. Polyimide films can be prepared by ultraviolet irradiation of high solids content varnishes of the monomers in a small amount of solvent, e.g., cyclohexanone, dimethyl formamide, N-methylpyrrolidone and the like. These novel polyimides are characterized as having high 25 glass transition temperatures, good mechanical properties and improved processing in the manufacture of adhesives, electronic materials and films.